WHAT TYPE OF ENGINE IS COMING?

Expert Discusses Various Types Now in Use and Gives Advice.

Every automobile owner would like to know the progress that is being made in automobile engine construction and what the future holds for the different types both in this country and in Europe. The writer has made a complete analysis of the engine situation and finds that the overhead valve is fast becoming the American standard, and though the six cylinder is the leader, with the four second, the eight third and the twelve last, there will be in a few years a sudden turn to multi-cylinders. European critics seem to believe that also abroad will the multi-cylinder engine gradually creep into first position. It may be difficult for many to see how the six cylinder can be displaced, but the same view was held of the four not so many years ago. The ideas that the eight and the twelve present mechanical complications and that the more cylinders the more trouble have been shattered. There are two outstanding features of the multi-cylinder engine which will make its appeal all the stronger. One is its performance and the other its quietness. Smoothness of torque—great pulling ability on high when the car is running slowly, quick pickup, reduction of vibration, are the results of multi-cylinder construction. Speed and power, while they may be had in the four or six, cannot be had with the same smoothness of operation as in the eight or twelve.

It was believed that the use of eight or twelve cylinders entailed the use of a long or wide hood because the engine took up more room than a four or six. As a matter of fact we now have eights, with cylinders in a row, that are shorter than any six producing the same power and speed. In Europe the Lancia company is building a twelve cylinder which is no larger than a six and looks exactly like one, owing to the casting of all cylinders in one block. The two rows of cylinders are only 22 degrees apart and only one carbureter is used. As time goes on the all in a row idea will take hold and we shall see many such models in production.

In Europe the average car has four cylinders and a four speed transmission, while at present the American average is a six with a three speed transmission. Europeans do not object in the least to shifting gears and they are not so insistent upon obtaining the high gear performance demanded by American buyers, hence the four cylinder engine with the four speed transmission.

Gradually though the Europeans are coming to American ideas, for the Paris and London shows, recently held, indicate the following ideas that are being taken up practically by all European builders: Vacuum fuel feed, block casting of cylinders, removable cylinder heads, battery ignition, electric starting and lighting.

During the war American builders had a wonderful opportunity to work out details of design for the post-war engines, using some of the knowledge gained in the design of airplane engines. These builders have not worked out their designs as quickly as the foreigners who already have more than a dozen overhead valve engines with overhead camshafts. We shall see these designs on our cars a year or two hence.

It has been thought by the average automobile owner that a valve in head engine is necessarily more powerful than an L head or T head. The valve location is not the determining factor in power output, so it is possible to have an L head of given size even more powerful and speedier than an overhead valve engine. However, the overhead valve engine on the average is a more efficient type. The one objection to it, namely noise, has been almost entirely eliminated by improvements in design detail of the valve gear.

The automobile owner or buyer should consider that just because a car has an over head valve engine it doesn't make that car faster or better than one with another type of engine. As a matter of fact the engine may have many times the power and speed of another, and the car in which it is mounted give poor performance. The work the engine has to do must be considered. An engine of a big truck may produce 75 horse-power, yet the truck can only travel a maximum of twenty-five or thirty miles per hour. Some of the best cars made in this country and abroad have L head engines, as for example the Rolls-Royce of England, the Packard, Cadillac, &c.

It is a fact that engine vibration and engine torque or pulling ability have a bearing on the life of the rest of the car. Take a two-cylinder engine as an example. The heavy explosions coming infrequently jolt every part of the driving mechanism. Instead of a "thunderous" blow infrequently the four gives twice the number of explosions, but of minor magnitude. The six gives three times the number, each separate explosion being slight. The eight gives four times the number and the twelve six times as many as a two cylinder engine. The more the number of cylinder the greater the number of smaller explosions in the same time, hence the less the individual shocks to the whole power transmitting mechanism. This is why in a four-cylinder car you can almost feel distinct vibrations every time the engine fires, and what you can feel the car parts also feel.

20,000 GMC TRUCKS IN 1920.

Big Pontiac Plant Enlarged to Increase Production.

Anticipating the market for 1920, after research which covers not only this country but the export field as well, the General Motor Truck Company set the 1920 schedule of production at the 20,000 mark.

To work out this schedule elaborate preparations have been made at the plant, already among the most extensive in Pontiac, Mich. More than 100 new pieces of machinery have been added to the shops, the very latest savers of time and labor. Lathes, drills, reamers and other appliances they are making possible an accuracy into divisions of the almost invisible hair line.

This addition to rows of power driven tools gives the GMC one of the most complete machine shops anywhere, and systematic arrangement permits of both speed and exactness in carrying out the big programme.

FEDERAL DOES THE WORK.

In the delivery of food speed is an essential. The MacBride's Bread Company has bought a Federal truck to get the warm, fresh loaves to their customers.

Horses Surely Come High in Some Sections.

The Maxwell "Desert Rat" and the famous old Indian scout, Col. King Stanley, its pilot, posing before the remnants of the majestic chargers who once graced the portals at the San Francisco exposition held in 1915. The Colonel arrived in San Francisco the same day that the Pacific fleet steamed through the Golden Gate, and it was but a day later that President Wilson came to town. The Colonel regarded this as a fitting celebration to his return after having travelled more than 20,000 miles while circling the United States. A few days later Stanley guided his "Desert Rat" over the smooth roads to Los Angeles, thus completing the most notable trip perhaps that was ever undertaken by an individual.

HOW ENGINE WEIGHT HAS BEEN CUT DOWN

Tendency in Newest Cars to Decrease It Still Further.

By H. A. TARANTOUS,
Member S. A. E.

Every tendency in motor cars designed to-day is toward lighter weight.

Each new development announced as of prominence in automobile engineering circles has to do with making constructions of less weight, and in no particular has this been true to a greater extent than in the development of automobile engines.

When motor cars were first laid out and studied by the engineer one could only judge the horsepower of an engine by the cubic capacity of the cylinder. When an engineer found that his car was not powerful enough for certain road conditions his first idea was to increase the size of his engine in order to acquire greater power. That this was the wrong angle of attack has been proved by later development.

In adding size to his engine a weight in proportion to the cubic increase of his power plant was added in greater proportion so that after the car was finished, although it had greater power, yet on account of its weight it had lower performance in many cases than the original smaller engined design.

We can remember when motor cars were built approximately six sylinders of 5x7 capacity, from which as much as eighty horsepower could be had under the most favorable conditions possible. Nowadays in airplane work we get more than twice this power from the same volume.

The first principle which tended toward lighter weight in engine design was to get more work out of each cubic inch of cylinder displacement by making the engine turn over faster, so that, say, twice as many explosions per minute were had from the same volume.

This increase in motor revolution developed enormous stresses on the engine bearing so that considerable mechanical difficulty was had in making the engine stand up. For reasons which were then not understood bearings would burn out in spite of their areas and only recently in airplane development work has it been made possible to run large engines at really high rates of revolution.

The reason for the great bearing pressure on these engines was largely piston weight. Many attempts were made to lighten piston construction, but without much success until foreign designers conceived the idea of the long stroke motor, or what should more properly be called the small bore motor. By decreasing the bore of engine it was found possible to obtain total piston areas in far less weight with small bores than large, thus decreasing bearing pressures to a point where they were practicable for ordinary use.

Engines to-day weigh less than half as much per horsepower as the old type, and within a short period, by the amplification of many new principles recently learned in aircraft and other modern development, engines will again be halved in weight.

This reduction in engine weight not only will save us regards the power plant, but undoubtedly will result in an entire reanalysis of the whole motor car chassis and mechanical arrangement.

If the problem of easy riding in light car construction can be solved even to the extent which now obtains in the unusual riding ease of a motorcycle side car in proportion to its weight then may we look for something radical in cars and startling in motor car performance.

NEW CLEVELAND RECORD.

Car Makes Perfect Run Climbing 7,630 Feet in the Sierras.

The Peacock, Alexander & Hunter Company, San Francisco dealer for the Cleveland Light Six, has given the Cleveland an "altitude" record. Other dealers have driven the car across the continent, over deserts, through mud and sand and up steep grades, but it remained for the San Francisco dealers to establish an "altitude" record. A number of the Peacock, Alexander & Hunter organization drove a Cleveland stock car up the Placerville Lake road in the California Sierras to the summit of the highway which is 7,630 feet above sea level. The car finished with a perfect score. It is the first Cleveland car to make an "altitude" record and has been christened the "Sierra Pioneer."

J. L. GOODALL COMES HERE.

J. L. Goodall, who joined the Bearings Service Company at general offices in Detroit, Mich., October 14, 1916, has been promoted branch manager of the office in New York city. Since February 15, 1917, he has been branch manager at Indianapolis. He takes the place of L. H. Ward, who resigned from the company December 1. Mr. Ward was branch manager at Philadelphia before going to the New York office.

OLDEST TRUCK HOLDS RECEPTION

Pierce-Arrow Veteran Helped Build Armory in Which It Is Exhibited.

An interview with Pierce-Arrow truck No. 25, New York's oldest worm-drive truck, which is being exhibited this week at the Motor Truck Show in the Eighth Coast Artillery Armory.

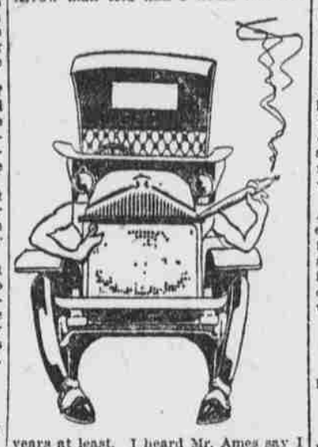
How do I feel? Right at home.

Why shouldn't I? Guess you didn't know that two of my younger brothers and I hauled nearly every stick and stone in this armory, did you? Well, we did, and it seems good to settle down here for a few days and take a look around.

You see, I've been around quite a bit—nearly 150,000 miles—and I'm still going strong. There are thirty-three of us—all Pierce-Arrows—in our family up at the Ames Transfer Company, and although I don't like to seem boastful, it is a fact that I can put in just as hard a day's work as the youngest of them.

Ive always been more more or less of a pet of the boss. Back in 1911, when he adopted me, he had been having all sorts of troubles with his mules and he had ninety-eight of them. They couldn't work during the winter months and would get "soft." And all during this period the bills for heat and food and housing kept coming in. After they had been idle during the winter months they required cautious handling for six or seven weeks before they were fit for hard work.

Well, Mr. Ames adopted me. A Pierce-Arrow man told him I would last five



years at least. I heard Mr. Ames say I wouldn't last two. But I've certainly fooled him. I've lasted eight years already and I feel fit for more.

Right off the bat Mr. Ames found I could travel from 60 to 75 miles a day with four yard loads. This beat the mules all hollow, for a team would last only 20 miles a day with half the load I could carry. So it was only natural that Mr. Ames bought two of my brothers at the end of a year.

The three of us carried all the material for the Montefiore Home and Hospital after the mules had failed. The grades were so steep that five extra hitch teams had to help the teams up them. But we walked right up with full loads without any laboring.

The three of us also carried the material for this building that the show is being held in. In the meantime the boss was buying more Pierce-Arrows.

In the winter of 1914-1915 four of us hauled 75,000 barrels of cement to the Aqueduct contractors. We had to keep going despite two severe snowstorms that stopped most traffic.

Before September, 1915, our family had increased to 20 Pierce-Arrow five tonners. Many of my younger brothers were equipped with hydraulic hoists and dump bodies. My dump body was operated by hand. Although I was more than four years old Mr. Ames decided I was fit enough to warrant the expense of this more modern device, so it was installed, and I have been able since then to do even a larger day's work.

I feel pretty proud of one thing. I am one of the famous group of the "First Fifty." Everybody knows our record. We were the first fifty trucks built by the Pierce-Arrow company and to-day only two of us are not in operation. One of us was retired after seven years of hard work, and the other met a tragic end—destroyed by fire when only five years old.

I've heard my boss say that we Pierce-Arrows are the cheapest trucks to operate. He says we last so long that our first cost is spread over many years of service, and that we earn the most profits because we lose less time on the job or off the job, and deliver more work within a given time.

HEIRESS USES DODGE CAR.

Miss Armour Travels About in Business Automobile.

When the guests of Miss Lolita Armour whirl away from El Mirador, her beautiful Southern California estate, for an outing they sometimes travel in an attractively finished and equipped Dodge Brothers business car, presented to her by her father, J. Ogden Armour.

To match the unique natural oak finish which the metal body and hood received, the removable seats and back rests were upholstered in chrome leather with the result that the car is attracting a great deal of attention in Monticeto, Cal., near which Miss Armour's estate lies. In addition to the picnic car, a Dodge Brothers touring car and roadster are used on the Armour estate.

New One Ton Federal.

After ten years experience in truck building the Federal Motor Truck Company, Detroit, Mich., found that even in lighter models the heavy duty truck standards must be incorporated to produce a truck of long life.

This essential feature was worked out in the new one ton Federal—a truck car designed and built from the ground up for trucking purposes, a truck of duration and more general utility than the so-called light delivery cars.

The officials of this company believe that such a truck has a place of its own in modern transportation. The tendency is for more speed and lighter models and to meet this demand the new one ton Federal was built.

It contains all the sturdy lines of the larger Federals with the added feature of speed, a governor controlled speed of twenty-five miles an hour. It is not a heavier truck cut down or a passenger car design chassis with heavier members and springs. It is not a makeshift.

It has pneumatic cord tires, which make for speed, pressed steel frame and disc steel wheels. It has a heavy, strongly supported radiator guard, electric lights mounted on swivels, which may be turned wherever light is needed, and a special hard surface battery.

It possesses a thoroughly proven power tire pump on transmission, electric generator and a radius rod, which, like the radius rod on all Federals, takes the power thrust from the springs. The seat and dash are of steel construction as in all Federal models.

This one ton Federal is backed by thoughtful and careful designing with the main purpose of giving successive and continuous delivery. It is a truck that is built to give service year in and year out, a truck that can be depended upon.

The truck has speed and power, durability and dependability.

OWNERS' SERVICE DEPARTMENT.

Q. Two cars maintaining a steady clip which has the greater resistance—the one going very fast or the one going very slow?

A. I am going to explain to you wind resistance. The wind resistance increases with the speed of the car. Disregarding the wind it takes less power to keep the fast car rolling than it does the slow car.

* * * * *

Q. What is the correct and safe way to make the descent of a long and dangerous hill with a dry surface? Ditto—when wet and slippery?

A. Regardless of the condition of the roads always descend a steep grade in one of the lower gears. An extremely steep hill should be descended in first speed, and if the vehicle goes down too fast then apply the brake. You should cut off the ignition when descending.

* * * * *

Q. We have been informed that the Government is selling, in fact has sold, several Dodge Bros. touring cars at a reduced price, which previously were in commission for official use. Is it possible that you would be good enough to inform us where and what date the above class of cars can be found for sale?

A. Such cars are being sold in various parts of the country. Write to the Quartermaster's Department, Washington, D. C.

* * * * *

Q. Does a piston at any time stop performing its duty in a moving motor? (G. T. L.)

A. Yes. The piston comes to a dead stop for the very smallest fraction of a second when it reaches the top of its stroke.

NEWARK HAILS FEDERAL 'BUS.'

A familiar sight between Newark, N. J., and outlying districts is the large two ton Federal labelled the American Bus Company.

AERO IDEAS IN LAFAYETTE.

Hollow Shafts and Special Alloys Among Advanced Engine Features

With the passing of fourteen months since the armistice was signed and the stimulation of motor car development by the removal of war time restrictions, the aerial efficiency, which characterized the most spectacular branch of the allied armies during four years of sky fighting, is now being translated into land efficiency by the automobile engineers of America and Europe.

The inevitable, in fact, has happened, since the conclusion was foregone, as far back as 1917, that aircraft engineering principles would exert a powerful influence on the post-war automobile.

This forecasted influence is especially evident in the new La Fayette, built by the Indianapolis company headed by Charles W. Nash and now making its premiere in the main lobby of the Hotel Commodore.

The designer of this eight cylinder car, D. McCall White, was prominently identified with the development of the Liberty motor and had an excellent opportunity to study aircraft principles and make practical adaptations. Consequently, the incorporation in the Lafayette of features that smack of aviation is not unexpected.